Our silent enemy: ashes in our libraries

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Scholars, scientists, physicians, other health professionals, and librarians face a crucial decision today: shall we nourish the biomedical archives as a viable and indispensable source of information, or shall we bury their ashes and lose a century or more of consequential scientific history? Biomedical books and journals published since the 1850s on self-destructing acidic paper are silently and insidiously scorching on our shelves. The associated risks for scientists and physicians are serious—incomplete assessment of past knowledge; unnecessary repetition of studies that have already led to conclusive results; delay in scientific advances when important concepts, techniques, instruments, and procedures are overlooked; faulty comparative analyses; or improper assignment of priority.

The archives also disclose the nature of biomedical research, which builds on past knowledge, advances incrementally, and is strewn with missteps, frustrations, detours, inconsistencies, enigmas, and contradictions. The public's familiarity with the scientific process will avoid unrealistic expectations and will encourage support for research in health. But a proper historical perspective requires access to the biomedical archives. Since journals will apparently continue to be published on paper, it is folly to persist in the use of acidic paper and thus magnify for future librarians and preservationists the already Sisyphean and costly task of deacidifying their collections.

Our plea for conversion to acid-free paper is accompanied by an equally strong appeal for more rigorous criteria for journal publication. The glut of journal articles—many superficial, redundant, mediocre, or otherwise flawed and some even fraudulent—has overloaded our databases, complicated bibliographic research, and exacerbated the preservation problem. Before accepting articles, journal editors should ask: *If it is not worth preserving, is it worth publishing?*

It is our responsibility to protect the integrity of our biomedical records against all threats. Authors should consider submitting manuscripts to journals that use acid-free paper, especially if they think, as most authors do, that they are writing for posterity. Librarians can refuse to purchase journals published on acidic paper, which they know will need restoration within a few decades and will thus help deplete their budgets. All of us can urge our government to devise a coordinated national conservation policy that will halt the destruction of a century of our historical record. The battle will not

be easy, but the challenge beckons urgently. The choice is ours: we can answer the call, or we can deny scientists, physicians, and historians the records they need to expand human knowledge and improve health care.

Who controls the past controls the future: who controls the present controls the past, ...
George Orwell, 1984, p. 249

Allow me to call the attention of your readers to the present state of that wretched compound called Paper. Every printer will corroborate my testimony; . . . our beautiful Religion, our Literature, our Science are all threatened. . . . I have in my possession a large copy of the Bible printed at Oxford, 1816 (never used), and issued by the British and Foreign Office, crumbling literally into dust. . . . I have watched for some years the progress of the evil, and have no hesitation in saying, that if the same ratio of progression is maintained, a century more will not witness the volumes printed within the last twenty years [1].

Is that the lament of a contemporary scholar or librarian? It is not. It is the complaint, in 1823, of John Murray, an English science writer and lecturer. When the leaves of his Bible were placed on a heated metallic disc, volatile acidic matter evolved, and with the approach of ammonia, he saw white vapors. The presence of hydrochloric acid he attributed to the interaction of calcium chloride from the paper-bleaching procedure with the acidic environment derived from excessive alum sizing in the paper. Since then, improvements in bleaching have removed that danger, but the sizing continues to threaten our library shelves with the ashes of slow acidic burnings.

WHY IS PRESERVATION NECESSARY?

Why does the durability of paper deserve our attention? For intellectual, historical, social, cultural, political, and economic reasons, among others. One of the characteristics that distinguishes the human race from other members of the animal kingdom is the ability and desire to record information for posterity—to produce a collective memory that spans centuries, cultures, and national borders. Paper has been a primary medium for recording the history of our civilization, so its durability is of paramount importance. The benefits humanity derives from this historical record are numerous and well known—evident not only in more creature comforts and aesthetic and intellectual pleasures from art, literature, and music, but also in our improved health and well-being. As Cicero aptly stated, "History is the witness that testifies to the passing of time; it illumines reality, vitalizes memory, provides guidance in daily life, and brings us tidings of antiquity" (De Oratore, II, 55 B.C.). Part of that history, the record of biomedical science, is our special concern here.

Cacoethes scribendi, the itch to write, has long been recognized as a strong human urge [2]. With the introduction of writing around 6,000 B.C., recorded history began. "One of the deepest impulses in man," wrote John Jay Chapman in *Memories and Milestones,* "is the impulse to record,—to scratch a drawing on a tusk or keep a diary, to collect sagas and heap cairns. This instinct as to the enduring value of the past is, one might say, the very basis of civilization." In prehistoric times, man used a number of materials to record his thoughts and ideas: stones, cave walls, clay tiles, wooden tablets, then papyrus, parchment, and vellum. All were costly, cumbersome, or fragile. In 105 A.D., a Chinese court eunuch, Ts'ai Lun, discovered paper [3]. At first, rags were used to form the pulp, but in the latter part of the seventeenth century a method of maceration by the use of metal bars over stone plates resulted in fibers that contained metal fragments. Then, in 1774, the introduction of chlorine to bleach the rags resulted in formation of hydrochloric acid. Later, gelatin was replaced as a sizing agent by alum-rosin, which leaves a residue of acid-forming sulphur.

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Some writings of 35,000 years ago on cave walls and clay tablets remain in good condition, while a 1912 work of Henrik Ibsen's and even later works of literature are already discolored and brittle. Paper manufactured in 1600 is still good, but after chemicals and mechanical processes were introduced into the manufacture of paper, its quality began declining. Less than 10% of materials published in the 1660s are embrittled today, whereas severalfold that percentage of those published after 1860 risk embrittlement [4]. Thus, the only publications that we can expect to remain intact are those published very early and the comparatively few printed on acid-free paper since the 1970s. Acid-free paper was developed in the 1940s, and although the damage wrought by acidic paper had been recognized earlier, little attention was paid to it until the Barrow report in 1959 [5]. Alkaline paper

is estimated to have a life expectancy of 500 or more years and, in addition, has several other significant advantages: the process reduces water consumption, facilitates waste treatment and compliance with environmental controls, conserves energy and cost of materials, and is cleaner and, on balance, less corrosive to machinery than acid-based manufacturing procedures. Yet in the early 1980s only about 25% of paper used for books was acid-free. A book published today on acidic paper has been estimated by some to last only about thirty years.

WHY PRESERVE SCIENTIFIC PUBLICATIONS?

The past as prologue

To ignore the silent enemy in our midst is to degrade the work and wisdom of our predecessors. To consign past ideas and observations to passive euthanasia as we exult over the wonders of modern high-technology is presumptuous; without past knowledge, those wonders would not have occurred. How do we place present knowledge in proper perspective if we go blindly forward, in loose-cannon fashion, without absorbing, assessing, and assimilating all previous knowledge on a subject? The proliferation of such isolated observations without proper interpretation may massage the egos of individual workers but ill serves science and humanity.

Historical value

In the pages of the scientific archives are much of interest and value to historians: human drama—of the psychosomatically, chronically, and gravely ill; of scientific rivalry, deceit, and bitter debate; of the courageous who self-experimented or toiled day and night in tiny, ill-equipped laboratories, patiently pursuing some scientific truth. Also residing in those pages are examples of plagiarism, fraud, and misconduct in science, which, although not contributing to the advancement of knowledge, should also be preserved, as reminders to editors and reviewers of the need to remain vigilant against such unethical practices and as an accurate record for the historian's proper evaluation of the course of science.

Bibliographic research

Science is an accumulation of hypotheses, observations, and techniques, reflecting a fragmented process in which discoveries, inventions, and increments of knowledge are continually being added. The scientist/scholar sifts through the massive data, scrutinizing, analyzing, and evaluating their plausibility, validity, and utility. The responsible investigator begins each prospective research project with a thorough bibliographic search of previous publications on the subject under study. Depending on the nature of the investigation, the scientist/scholar will set appropriate limits on the search or will extend it as far back as references are available.

In biomedicine, investigations into many phenomena, such as the natural evolution of disease, genetic factors, and the validity and significance of certain research findings, require observations and analyses over years, decades, generations, or even longer. From an accumulation of such data, including case reports, incidence, etiologic factors, patterns of development, pathophysiologic phenomena, and mortality figures, a better understanding of the pathologic process emerges, which may lead to effective methods of treatment. Without accessibility to all previous publications, conclusions and judgments may be based on fragmentary data and evidence, and may therefore be inaccurate or misleading. When human health is involved, such inaccuracies assume vital significance.

The history of science records instances of research findings that were initially rejected but eventually accepted, and vice versa, and it is therefore important for scientists to continue evaluating the results of research, sometimes over protracted periods. During World War I, Polanyi published a simple theory of gas adsorption that provided a better explanation of most of the experimental results [6]. Physicists initially accepted it, but then found it to contain a basic contradiction of the tenets of quantum mechanism, the dominant concept in physics in the 1920s. The theory was therefore abandoned until the 1930s, when another scientist showed that it could be reconciled with the quantum mechanism. Polanyi's theory was then reaccepted. Without ready access to past research reports, such re-examination and re-evaluation would not have been possible.

The responsible investigator begins each prospective research project with a thorough bibliographic search of previous publications on the subject under study.

A characteristic of science is its constant state of flux, being continually expanded, validated, refuted, reshaped, modified, or updated. Today's "truths" are supplanted by tomorrow's "facts." Controversies are the norm, not the exception. Further observations and data may alter the reported incidence or natural course of a disease, the effects of a particular treatment, or the long-term adverse sequelae of medication. To judge the soundness of reported results, health practitioners must follow a succession of published articles on a given topic. Radical mastectomy, for example, which some years ago was the treatment of choice for cancer of the breast, has been questioned.

Until recently, chemotherapy was reserved for women whose breast cancer had affected the lymph nodes. Several new studies indicate that chemotherapy and hormones can improve the prognosis moderately in patients with early breast cancer. Once acclaimed the most effective drug for osteoporosis, vitamin D hormone is now the subject of controversy. Recent studies indicate that at safe dosage, the drug does not increase bone density or prevent fractures in women with osteoporosis. An issue of *Lancet* contained an article suggesting that oral contraceptives may increase the risk of cervical cancer, along with an editorial that they may protect against ovarian endometrial cancer [7–8]. What is a physician to do? In a single issue of *The New England Journal of Medicine*, the Framingham study report showed no beneficial effect of postmenopausal use of estrogens on cardiovascular mortality, whereas another group concluded that such use reduces the risk of severe coronary disease [9–10].

Is coffee a major contributor to variations in levels of cholesterol [11], or is there no association [12]? Both points of view have been reported months apart in *The New England Journal of Medicine*. Is coffee not a factor in the development of atherosclerotic cardiovascular disease, as reported in *The New England Journal of Medicine* [13], or is there an association between the amount of coffee drunk and elevated plasma concentrations of such well-established cardiovascular risk factors as the level of LDL-cholesterol, as reported in the *Journal of the American Medical Association* [14]? Does aspirin cause kidney damage? Does coffee help low blood pressure? Can chocolate fight tooth decay? The answer depends on which year you are consulting the journals.

With the declining interest in history and with the easy electronic retrievability of references, some contemporary investigators limit their searches to this technique and therefore to the period covered by the electronic databases, that is, after 1965. Such a practice is unfortunate—and unscientific—for it involves a number of risks, including assessing past knowledge incompletely, perpetuating inaccurate data, making faulty comparative analyses, repeating studies that have already led to conclusive positive or negative results, or assigning priority improperly. This unfortunate inclination, however, is used to bolster the anti-intellectual argument that the quality of current paper publications is unimportant.

Every scientist/scholar has been frustrated by the inaccessibility of crucial or potentially pertinent references. That a publication is old, obscure, or in a foreign language is irrelevant to the searcher; when he needs it, he wants access to it. Publications not readily available may be central, in fact even critical, to his study. It is the responsibility of librarians to make this material accessible. It is also their responsibility to preserve that part of the collection that deserves preservation. Because scholars and scientists are the major users of library collections, their opinions are, of course, indispensable in decisions regarding selection and preservation.

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The dangers of overlooking previous work

In biomedical science, unlike other disciplines, research work is considered original even if it uses the same data presented or discussed previously, provided a new interpretation or new insight is offered. Use of the same data should lead to the same results, barring errors in method, collection, analysis, or interpretation. Reproducibility is an essential component of the scientific method, but scientific research is also susceptible to unnecessary duplication. The avoidance of wasteful duplication depends on the scientist's knowledge of current and past research, and that knowledge depends partly on availability. The history of science is sprinkled with examples of unnecessary duplications, rediscoveries, and delayed advances attributable to the inaccessibility of publications or their oversight by later researchers.

Perhaps the best known instance of discoveries ignored or overlooked only to be rediscovered is Mendel's classic work on genetics in 1866, which was ignored for several decades before it was rediscovered [15]. Another is Cormack's recomputation of a problem in the development of computed tomography that had been solved fourteen years earlier by J. H. Radon and published in a paper that escaped Cormack's notice [16]. Sir Andrew Huxley cited six additional examples of key discoveries made in the nineteenth and early twentieth centuries but forgotten by 1950 [17].

Importance of the biomedical record to editors, reviewers, the press, and the public

Critical scrutiny of new scientific data implies skepticism; when reviewers examine a scientific manuscript, they are expected to ferret out any inaccuracies or illogicalities it may contain. As the arbiters of publication, editors and reviewers serve as filters and must therefore be familiar not only with current publications on the subject, but past—even distantly past—ones as well. Referees whose knowledge is limited to publications in electronic bibliographic databases bring deficient memory and apply inadequate rigor to their reviews.

The ethical, economic, and political issues in science and technology that require decisions today are more complex and difficult than ever. How do we apportion public funds among a plethora of competing health needs? How do we finance the health care of the indigent and of the growing proportion of the elderly whose lives have been extended by high-technology medicine? Who determines the medical fate of the critically ailing newborn, the aged, the socially deviant, or the criminally insane [18]? Is a cure for AIDS more urgent than reducing the alarming rise in drug addiction? Is building a superconducting supercollider more important than mapping the human genome? To make informed judgments about such social issues involving biomedical science, those without adequate specialized knowledge, including legislators, science writers, and others who help shape public policy, need to understand the related forces and pressures operating in science and society. A study of such factors in history leads to better understanding and therefore sounder judgment, for, as Thomas Jefferson wrote, "History, by apprising [men] of the past, will enable them to judge of the future; it will avail them of the experience of other times and other nations; it will qualify them as judges of the actions and designs of men. . . ." (*Notes on the State of Virginia*, 1784).

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If we are to have a scientifically literate society—and it is clearly to our advantage that we do—the public must be aware that the scientific "breakthroughs" announced so dramatically and sensationally by the press do not occur in a vacuum. Scientific advances take place by accretion, derived from past fragments of knowledge and observations that have accumulated, been organized, and sometimes been fused over the years. Between the major advances are long stretches of infertility and even regression. Research is not for the impatient, the dilettantish, or the easily deterred. Scientific discoveries take time, and the path that leads to them is strewn with missteps, frustrations, inconsistencies, enigmas, contradictions, and detours. If the public better understood the nature of research, its expectations might be more realistic and its support of sound health-related research might be stronger. If, however, the history of scientific research has been reduced to the ashes of self-destructing acidic paper, it cannot be communicated to the public.

Research priority

Preservation of the biomedical archives is also important to protect priority, a major incentive in research. A scientist establishes priority by publishing his findings in a professional journal, which is considered the permanent record and which can be consulted in case of dispute. The need to establish priority was, indeed, a primary factor in the establishment of the professional journal [19]. This is the record that is subjected to scrutiny by the scientific community, which, by critical analysis and attempts at reproducibility, either corroborates or refutes an author's conclusions. If this record is destroyed, the incentive of priority disappears, the chance for wasteful duplication rises, and science loses a valuable record of information and accomplishments.

Unlike the commercial inventor, the scientist who publishes a report of his discoveries usually receives no remuneration for his intellectual property. Indeed, he surrenders the copyright to the publisher. He may, in addition, be required to pay a fee for the review and publication of his manuscript, and, if he wants to accommodate requests from colleagues for copies of his printed article, he must even buy back his own words by purchasing reprints of his published paper. Scientific scholarship, nevertheless, has a firmly ingrained reward system. The major incentive for doing research, aside from satisfying the scientist's own intellectual curiosity, is recognition for priority. Indirect financial rewards may also ensue from major scientific achievements, in the form of professional promotion and easier access to research funds. In the absence of significant financial reward, however, obliterating recognition and priority by inaccessibility of a scientist's contributions weakens the incentive.

The rush to publish is driven heavily by the pursuit of priority. Those who defer publication until adequate data have been collected and analyzed, in fact, have sometimes been preempted by others who submit "the least publishable unit" for publication—an abstract, letter to the editor, or brief communication. Once a discovery is announced, the obscure work of the acclaimed scientist's predecessors, if recalled, may be seen in a new light and assume new importance. To be recalled, it must be accessible. When Fleming, in 1928, noted the antagonism between microorganisms, he did not know that it had been observed long before and had been applied empirically [20]. In 1875 English biologist John Tyndall observed the bacteriolytic properties of certain species of penicillium, but he did not try to explain the mechanism. Two years later, before Tyndall had published his observations, Pasteur and Joubert noted the same properties. They cultured a colony of anthrax bacillium in a broth of sterile urine and noted that some airborne microorganisms could hamper the development of

culture and could destroy the bacilli under study. They injected into guinea pigs anthrax bacilli and airborne germs like those found in their experiments. In his report of these experiments, Pasteur stated that "All these facts may legitimately encourage our greatest hopes from a therapeutic point of view" [21].

Today, especially, when the public press plays a crucial role in assigning acclaim and prestige, the originator of a medical concept, instrument, or procedure may be ignored when a subsequent worker popularizes the contribution. But a scientific discovery labeled as "original" is not created independent of all other concepts; it represents a link in an intricate chain that includes the past, present, and future. Particles of new knowledge, once introduced into the information system, stimulate further analysis or inquiry, and lead to further information. Popularizers do not always cite those whose work was indispensable to their own findings and may therefore not give credit where credit is due. In those circumstances, the originator has been denied his rightful recognition, and young scientists may conclude that opportunism is more effective than traditional professional ethics. Science writers and others in the public press therefore have an obligation to be familiar with the history of a scientific advance on which they are reporting. Journalists who merely act as a medium for transferring direct, undocumented quotations from the scientist to the public do their profession and society a disservice. If, of course, the relevant previous publications are crumbling on library shelves, they are lost to the historical record and therefore to science writers and others who need them.

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ARE PAPER PUBLICATIONS OBSOLETE?

Some argue that the deterioration of books and journals is not critical, now that the age of high-technology is here, and so we need not be concerned about the quality of paper today. I see no signals of our becoming a paperless society; all indicators, in fact, point in the opposite direction. The electronic age is generating more, not less, paper. Paper publications are neither obsolete nor obsolescent. No modern electronic medium has yet matched the advantages and appeal of paper books and journals: easy portability; no need for cumbersome and unfriendly equipment; and efficient, convenient, comfortable reading of hard copy. I know few people who curl up in their favorite chairs with their high-tech paraphernalia.

Shall we ignore the indicators and continue to allow the self-cremation of future paper publications? Let us remember that deacidification and transference of disintegrating material to film or other media, necessary as they are to right past mistakes, are extremely costly, time-consuming, and laborious. Deacidification, moreover, does not reverse the damage that has already occurred; it merely halts further scorching. Nor is the longevity of the new media by any means certain [22–24]. So long as we continue to publish on paper, and we apparently will for the foreseeable future, it is irrational for us to keep using acidic paper and thus add to the mounds of material that will require restoration or transference in the future. The preservationist's task is already Sisyphean. By adopting alkaline paper as a standard today, as Dr. Donald Lindberg, director of the National Library of Medicine, has urged, we can stop the damage at its source and diminish the magnitude of the preservation problem for future librarians, archivists, and preservationists.

Few besides authors enamored of their literary offspring will deny that not all biomedical journals and books deserve preservation.

IS IT WORTH PRESERVING?

Our advocacy of the use of acid-free paper by publishers of scholarly biomedical books and journals is accompanied by our continuing plea for more rigorous criteria for publication. We agree with Langley that "much that [the scientific man] is forced to read consists of records of defective experiments, confused statements of results, wearisome description of detail, and unnecessarily protracted discussion of unnecessary hypotheses. The publication of such matter is a serious injury to the man of science. . ." [25]. Few besides authors enamored of their literary offspring will deny that not all biomedical journals and books deserve preservation. Certainly the world would not have suffered had many scientific publications never seen print. Even more certainly, our preservation problem would be far less daunting. But in a country that prizes open communication and decries censorship, it is difficult to suppress the itch to write. In academia, the itch has been abetted by the linking of bibliographic quantity to faculty promotion and tenure. The resulting glut imposes the need to decide

what to preserve and what to allow, mercifully, to vanish into ashes.

An estimated one-quarter of manuscripts submitted to United States science journals are rejected, as contrasted with three-quarters of those submitted in the arts [26]. In the biomedical sciences, the tendency is to accept manuscripts of mediocre or even dubious quality as a precaution against rejection of one that might later prove to be important. Distinguishing the crank from the genius in science is not an easy task. Reviewers also sometimes accept insignificant manuscripts simply because they can find no inaccuracies in them. Such lax policies overload the bibliographic databases, encumber efficient searches, and magnify the preservation problem. It is unfortunate that important original contributions cannot be printed on nonacidic paper and those of less durable value on impermanent paper, their pages perforated for easy removal before binding. But the imperfection of human judgment and other desiderata preclude such a neat arrangement.

Those who wish to launch a new periodical should ask themselves: *Is this journal really necessary?* Are its scope and purpose already served by an existing journal? If so, is its establishment the result of a schism in professional ranks, and is it designed to serve the egos of its launchers? The resemblance to a vanity press is not implausible, for the authors seem to be writing for themselves, not for readers. Certainly, the excess of mediocre periodicals does not serve its purported beneficiaries; such publications may enhance the credentials of the editors, reviewers, and authors, but are left largely unread. Journal articles seem to multiply with wild abandon, the number of articles per journal having increased by as much as 35% during the past twenty years. The National Library of Medicine receives 22,000 serial titles (journals and other documents) a year; 3,500 of these, containing 330,000 articles, are indexed annually. Such prodigiousness reflects a system of information that is out of control, expanding by 5 to 7% a year, and doubling every ten to fifteen years.

The copiousness of the material to be scanned or retrieved during bibliographic research is oppressive. For every useful article, there may be fifty or more that are superficial, redundant, invalid, seriously flawed, inconsequential, fraudulent, or otherwise not worth storing or preserving [27-33]. Not only does the excess waste time and effort that could be more productively applied, but it may discourage the scientist/scholar or physician from conducting an adequate bibliographic search because he is unwilling or unable to invest the time and labor required to sift the paucity of wheat from the plethora of chaff. The article that he misses, however, because it is buried in the morass of publications, may hold information crucial to his purpose. In the case of practicing physicians, rejection of the surfeit of citations may mean that patients are denied the more effective care that pertinent information could have provided.

Since we consider much of what has been published unworthy of preservation, we would repeat our recurring question to biomedical authors, editors, and publishers of scholarly books and journals: *"If it is not worth preserving, is it worth publishing"* [34]? Applying this criterion to submitted manuscripts would reduce the abundant ephemeral material scattered among the pearls worthy of preservation and would simplify the work of all who use and maintain library collections.

WHAT CAN WE DO?

The two crucial questions are: What should be preserved, and how should it be preserved? To determine what needs to be preserved, perhaps we need a committee, composed of recognized experts in the various disciplines and of librarians, archivists, preservationists, historians, and others, to select publications with "intrinsic value." Its task would be formidable, provocative, and controversial, but the alternatives of preserving nothing or everything or of selecting items on an *ad hoc* basis are obviously imprudent and impractical. Decisions cannot be guided by a single criterion. Contrary to the philosophy that yielded the *Science Citation Index*, the most heavily cited publications are not necessarily the most worthy. For one thing, citations do not always designate corroboration; the Darsee publications [35-45], for example, have been heavily cited in articles about fraud, but certainly not for purposes of affirmation. Other articles may be cited to be challenged or refuted [46-57]. Bias, although reprehensible in the scientific search for truth, operates nevertheless, and scientist/authors may therefore deliberately omit references to the work and publications of rivals. Scientists, moreover, are more likely to cite their own work for legitimate, as well as self-interested, reasons. In our highly specialized world, a scientist will often pursue a single subject for years, publishing progress reports periodically, with legitimate reference to his earlier work. Such citations do not necessarily validate his conclusions, since that depends on replication by other scientists. The decision to preserve requires more reliable criteria than a citation index.

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Librarians, who make decisions about new books and journals, can play a major role in encouraging the use of acid-free paper and its identification by a

symbol. Fortunately, antipollution laws as well as economic forces have accentuated interest in acid-free paper. In the biomedical sciences, publishers depend on purchases by librarians as a source of large and reliable sales. If librarians refuse to purchase books and journals published on self-destructing paper, whose preservation will usurp future budgets, publishers will get the message that they must convert to nondegradable paper to retain these major sales. Unfortunately, some librarians do not consider the integrity of the materials or their structural quality in decisions regarding acquisitions. Most individual consumers are similarly disinterested in the quality of the paper in the books they buy. Once they have read a book, they discard it or put it away, never to be consulted again.

A coalition of information specialists, archivists, authors, researchers, editors, and readers, all with a vested interest in preservation, can persuade publishers, printers, and paper manufacturers of the propriety of using acid-free paper. Authors can exert their influence by favoring publishers that use acid-free paper and can urge editors who still use acidic paper to convert. Letters to congressmen and editorials and articles in professional journals, as well as the public press, will raise consciousness about this issue and focus attention on the need for a solution. All interested parties should also urge governmental agencies that produce important documents to use acid-free paper. The United States government is, after all, the largest publisher in our country and could properly set a precedent for other publishers. On February 8, 1989, Senator Claiborne Pell introduced a joint resolution (S.J. Res. 57) to establish a national policy on permanent papers. This resolution "reflects a growing concern about the impending loss of an enormous part of our historical, cultural, and scientific records and literature because of the self-destruction of the acidic papers on which books and other publications have been printed since the mid-nineteenth century" [58]. Our voices, singly and collectively, can be raised to capture the attention of Congress and the public and to prod the government of the United States to action. Education, awareness, cooperation, and an enhanced respect for our historical record can go a long way toward helping us eliminate this affliction at its source.

As professionals in the field of scholarship, we have a responsibility to preserve the historical record that we have inherited and the contributions that contemporaries are making to it. The library, which houses that record, pays homage to the past, acknowledges the present, and salutes the future. As a repository of our intellectual heritage and a center of scholarship, it deserves reverence and protection against all threats to its security. Withholding that protection will erase the history of our civilization for future generations, wiping clean the slate of centuries of accumulated knowledge. Aware of the dedication of our colleagues, we feel confident that they will not allow that to happen.

Creating awareness of this grave problem will not, however, be easy. A nation that has long turned a blind eye and deaf ear to rampant drug abuse, crime, and violence will not readily be whipped into a frenzy over the deterioration of books. A society with a quarter of its population functionally illiterate or semiliterate; with an ever-diminishing attention span; with an emphasis on immediate gratification, frivolity, and material worth; and with an addiction to the constant sensory stimuli of the electronic media will be hard to engage in the campaign to preserve our recorded heritage [59]. A people that is fascinated by trash television and reserves its highest financial rewards for a Madonna, a Michael Jackson, a Vanna White, a Sylvester Stallone, a Mike Tyson, or a Bruce Springsteen while it underpays and undervalues teachers, librarians, and others in intellectual pursuits clearly exalts entertainment above the intellect and is unlikely to respect the life of the mind or its instruments, books and journals. Writers who do attain "fame" today are hardly intellectuals; they produce "pop" books that become ephemeral best-sellers, bought by people who probably move their lips when they read. Show us a nation's heroes (or celebrities, as they are called today), and we will show you its values and standards.

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Unfortunately, intellectuals themselves are not likely to wage protest marches and demonstrations against acidic paper or to carry placards reading "Stop the Book-burning" or "Save our Civilization," although they will rush to defend the freedom of expression of authors of controversial or inflammatory books. The irony is that unless the defended books are published on acid-free paper, they are defending an inherently incendiary and therefore transient literary work. Despite their timidity, the danger is real, and the challenge beckons the stouthearted.

"How much sharper," wrote Aesop, "are the wounds of our own making" (*Aesop's Fables*, "The Eagle and The Arrow"). The slow burn of acidic paper in our

libraries is reducing the history of medical science to ashes. Allowing important records to self-destruct is tantamount to censorship—a passive suppression. As scholars and bibliophiles, we urge other concerned authors, scientists, practicing physicians, librarians, archivists, preservationists, and readers to join us in a plea to publishers, printers, and paper manufacturers to renounce the use of acidic paper for scholarly biomedical publications and thus to prevent the scientific history of our civilization from turning to ashes. The need is urgent and the hour dangerously late.

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